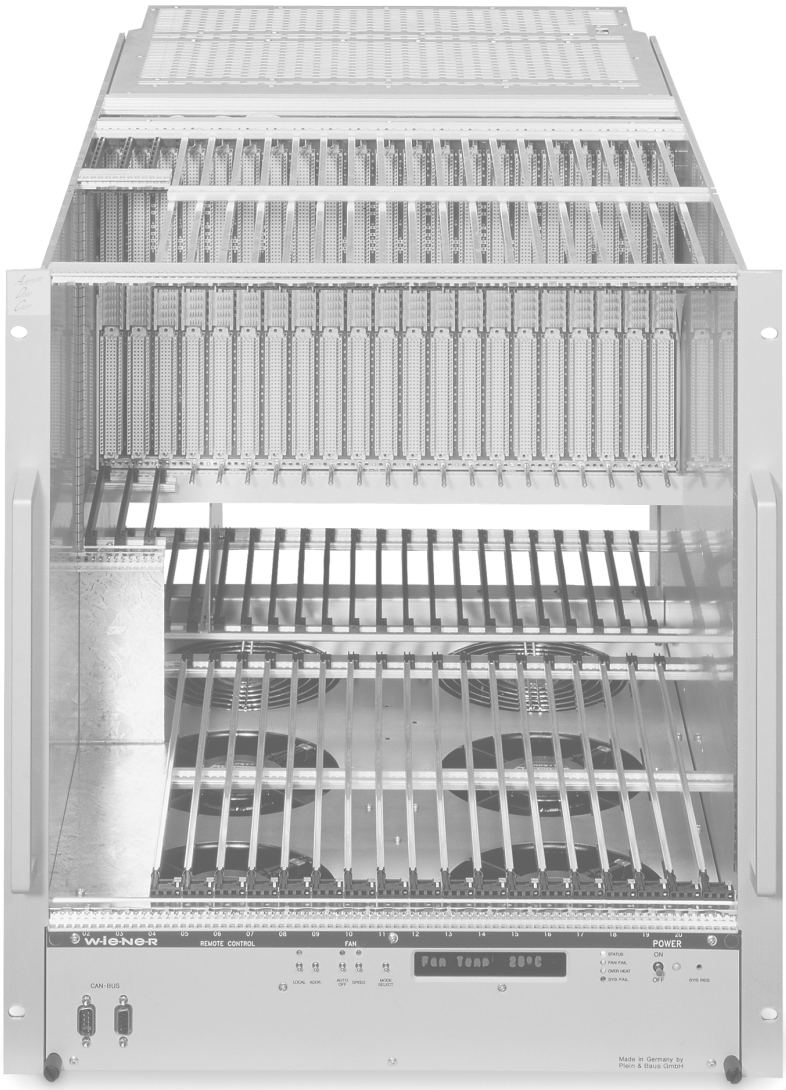


Series 6000 CERN

VME, -64x, -64xC, -64xP

User's Manual

*00571.A0

General Remarks

The only purpose of this manual is a description of the product. It must not be interpreted as a declaration of conformity for this product including the product and software.

W-Ie-Ne-R revises this product and manual without notice. Differences of the description in manual and product are possible.

W-Ie-Ne-R excludes completely any liability for loss of profits, loss of business, loss of use or data, interrupt of business, or for indirect, special incidental, or consequential damages of any kind, even if **W-Ie-Ne-R** has been advises of the possibility of such damages arising from any defect or error in this manual or product.

Any use of the product which may influence health of human beings requires the express written permission of **W-Ie-Ne-R**.

Products mentioned in this manual are mentioned for identification purposes only. Product names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies.

No part of this product, including the product and the software may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means with the express written permission of **W-Ie-Ne-R**.

Mains Voltage and Connection

The Power supplies are equipped with a "World"- mains input, which works properly form 94VAC up to 264VAC and within a frequency range of 47 to 63Hz.

Before connecting to the mains please double-check correspondence.

The mains input connection at the power supply side is done with a 3-pin Hirschmann connector (input current max. 16 A) or power terminals.

Hirschmann Pin No.	Signal	Description	Color of the Wire
Pin 1	L	Phase	black or brown
Pin 2	N	Return, Neutral	blue
Pin 3		not connected	
Earth	PE	Protective Earth	green/yellow

Safety

After connecting the Power box to the mains, the mains input module is powered permanently. Filter and storage capacitors of the power factor correction module are charged with about **400VDC**. The DC-On-Signal as well as a power switch at control board (if any installed) operates as a DC on/off switch only and not as a mains breaker. **Therefore it becomes dangerous if the box cover is open. In this case a lot of components on high voltage potential get touchable!**

Before starting any kind of work inside the power box remove the unit from mains and wait a couple of minutes with your activities! Discharge the primary DC Filter-capacitors by use of a well isolated 22 ohm 10W resistor.

We recommend in case of any male function to send the power box to Wiener or to one of our representative for service

Grounding Stud

Each VME- bin is outfitted with a grounding stud which has to be wired to mains earth or zero potential line **according to Cern's rule / law.**

The stud is situated at the right side panel behind the fan space (rear view).

Declaration of Conformity

Art. 10.2 of 89/336 and 89/392 / ECC

W-IE-NE-R

Plein & Baus GmbH

---

declare under our own responsibility that the product

VME / 6021Crate

Items: 0B0x.xxxx, 0F0x.xxxx, 0P0x.xxxx

to which this declaration relates, is in conformity with the following standards or normative documents :

1. EN 50 081 - 1
2. EN 61 000 3 - 2
3. EN 50 082 - 1
4. EN 60 950

Conditions:

This crate is not a final product. The use after installation and powered modules inside needs possibly additional screenings to be in conformity of the definition. Admitted for powering by all mains.

Name and signature of authorized person — Place and Date

Name und Unterschrift des Befugten — Ort und Datum

Juergen Baus

Techn. Director — Febr. 2000

Table of contents:

1 General Information

1.1 6021 Crates

The VME -Crate 6021 consist of a power supply (UEP 6021), bin (UEV 6021) and a fan tray (UEL 6020). All these components are plugged and easily to exchange.. Divider sets 6U/9U can be mounted into bins for 9U format modules. For powering of 6021 bins same UEP 6021 power supplies have to be used.

Available W-Ie-Ne-R VME backplanes:
VME64 with J1/J2, VME430 with J1/Jaux/J2, VME64x, VME64xP,
VME64xC with Jo special (Cern).

1.2 6020 Fan Trays

The-fan trays are plugged into the bin from the front side. For efficient cooling, controlling and monitoring of the crate various fan trays are constructed according to the slot deepness, whereas both, front and bottom air supply, is possible. Fan rotation speed is shown by use of LX fan trays and can be regulated; every fan is single controlled. Furthermore temperature of the air entry and optionally the exhaust above selected slots.

The UEL 6020 fan tray and control unit occupies two units of a 6021 crate below the VME / -bus slots. To achieve an excellent airflow homogenization through the inserted VME modules, all fan trays for 400mm modules (and larger ones) are outfitted with a topped plenum chamber which acts as a pressure volume below the VME modules.

Among the different types high performance super blower with four or six blowers can be used, too.

While 3 fold fan-tray can operate either with air is taken from the front and then pushed upwards to the modules or from bottom side, which gives full cooling efficiency. Deeper fan trays needs bottom sucking, otherwise the airflow would be limited by the front intake gaps.

For instance: The maximal air flow reached by a 3-fold W-Ie-Ne-R fan-tray (2U) with frontal inlet is not greater than 400 m^3/h. With bottom intake and free entry the airflow can rise up to 540 m^3/h.

The EC fan tray is the economic version and equipped with same blower than the LX version. Therefore both types give the same cooling performance and are pin compatible

1.2.1 LX Fan Trays

All DC voltages (up to 8) at backplane level and the corresponding currents among other are shown by the LX monitoring. The threshold-limits (minimum / maximum voltages and currents) can be set manually or piloted by remote control and remain stored even after lack of voltage. In case of global trip off, the fault will be displayed by the diagnostic system.

VME-signals ACFAIL and SYSRESET are generated according to VME-Specs. SYSRESET can also be released manually.

Remote-control by network (CANbus, IEC-Bus or H.S.CAENET) is optionally possible, whereas IEC and H.S. CAENET need the intelligent version of fan trays (LX), the CANbus may operated with all kind of fan trays.

Furthermore, remote control and monitoring of several crates is possible through a PC's compatible program. Change of trip off limits (specially for currents) through menu is possible (Option). Piloting circuits are isolated from VME-potential.

1.2.2 EC Fan Trays

The simplified fan tray, UEL 6020 EC, has no further facilities than DC on / off switch and Power LED which works also as Status indicator.
Optionally outfitted with CANbus connection. Full performance of CANbus is given only when the DC on / off switch is in ON position.

1.3 6021 Power Supplies

The VME power supply of the 6000 series is a micro-processor controlled switching power supply designed in the high density W-Ie-Ne-R - cavity technology, which provides a very low noise output voltage.

The mains input includes a power factor correction module which works according to EN 60 555-2/IEEE 555-2 (PFC). An external fuse or circuit breaker has to be installed (16A for 3U boxes with 2.5kW and 32A for 6U boxes with 5kW). The turn-on inrush current is limited by a soft start-circuit to a maximum value of about 12A (24A) when the cold unit has been connected to the mains.

The AC- input module is permanently powered after connecting the unit to the AC- mains. POWER ON/OFF activates only the DC on/off function of the power inverter modules.

The EN 50 081-1 for generic emissions as well as the EN 50 082-1 or 2 for immunity standards, in particular EN 55 011 RFI rejection (incl. VDE 0871 class B) and EN 55 022 electromagnetic compatibility is accomplished. The insulation performs the EN 60 950, ISO 380, VDE 0805 (SELV)! Furthermore are considered UL 1950, UL 1012, UL 478, C 22.2.950, C 22.2.220/234.

Therefore the UEP 6021 power supplies can fulfil the CE rules comprehensively and will CE marked for use at all power nets.

Turning on the power supply all voltages reach the nominal values nearly simultaneously within 50 ± 2.5 ms (start-end-time) whereby the voltage versus time curve shows a monotonic behavior. The switch-off-time which corresponds to a value of 10% of the nominal DC voltages is reached after 5±2.5 ms.

The power packs are readily replaceable. The maximum output power is ca. 1000... 2800W for a 3U power box, while a 6U box may have the double utilization. The available DC output power is in correspondence with the 92... 265VAC input voltage. Also the installed modules urge the efficiency (3,3V module efficiency is some lower then those of a 48V module). In practice for 230VAC mains more than 2600W for a 64x power supply with all fife standardized outputs is provided.

Booster mode with 400VDC as input voltage is possible (special terminals are requested). This makes 4500 W DC output possible with a 3U power box

2 Operation, Function and Connections

2.1 Fan Tray Operation and Control.

All monitoring and control operations are performed by a micro-processor based alarm and control circuit placed inside the UEP 6021 power supply monitored by UEL 6020**LX** (**EC** via CANbus only) fan trays. To protect both the power supply and the VME modules, a DC cut-off is started in the case of:

- **overheat**: in the power modules (each module is equipped with temperature sensors);

- **overload:** if maximal current is exceeded (trip-off due to programmed lower values is not indicated as overload)
- **overvoltage:** if voltage >125% (default, crow bar function)
  and if voltage >105% (default, can be changed via LX fan tray or network)
- **undervoltage:** if voltage <97.5% % (default, can be changed via LX fan tray or network)
- **fan failure:** if one or more fans fail

The reasons of a trip off will be displayed on the alphanumerical LX display.

Voltages, currents, cooling air temperatures (selectable °F - °C), fan speed, power dissipation of inserted modules, operation time of power supply and fan tray and optional net parameters, can be shown on the alphanumeric display of the fan-tray. The ADC resolution is 10 bit. The accuracy of the voltage measurement is better than 0.5%. The total accuracy of the current measurement depends on the corresponding voltage, i.e. for ±5V it is better than 2A in the range between 5A - 50A and for -2V it is better than 1A in the range between 1A - 20A. Above these current ranges the accuracy is <5% of the final value. In the case of ±12V and ±15V the accuracy is better than 0.2 in the whole current range.

2.1.1 Function of Fan Tray Switches

POWER ON /Off	main switch for ventilation and power supply
MODE SELECT	selection switch to choose items and values for fan-tray and power supply monitoring and control
SYS RES	protected located switch for VME SYSRESET circuit activation
FAN SPEED	push button for step wise in- or decrease of fan speed.
FAN AUTO OFF	one of two functions, selected by software (see 2.1.5): 1: Switch off after fan-failure (yes/no) 2: Activate the "hot swap" function of the fan [1]
ADDRESS	Optional if remote network is installed
LOCAL	Optional if remote network is installed (IEC Bus only)

The adjusting range of fan speed is from 1200 RPM up to >3000 RPM. Pre selected reference speed and displayed value are average RPM. The display shows the fan speed in flashing mode if the selected speed is not equal with the true speed. This happens when either the fans are still accelerated to the higher turns or the selected value is not reachable (if >3000 RPM and higher density modules inserted in the bin, etc.). After a certain time the FAN FAIL circuit will detect this status as fan fail! While the display shows average speed

of all fans only, the CANbus option (or other supported remote interfaces) will transmit the turns of each blower situated inside the fan tray.

2.1.2 Additional temperature sensors

Optionally installed temperature sensor(s), measuring the exhaust air, allows to switch the fan to stop. That will be achieved by keeping pushed the FAN SPEED button to lower speed about 10 seconds.

Also the sensor(s) will

- accelerate the fan speed to the maximum if the first (FanUp) programmed temperature threshold exceeds (default: 45°C) . During the out coming cooling air is above these thresholds, adjustment to lower fan turns is disabled, until the exhaust temperature is below the limits again.
- switch off the power supply if the second (PsOff) programmed temperature threshold exceeds (default: disabled) .

The sensors are placed normally above selected slots at the bin. In combination with EC fan trays these sensors can substitute the function of the LX fan fail circuit, partially.

2.1.3 Information by Fan Tray LED's

AC POWER	green large LED if *POWER* is on
STATUS	green LED if all voltages are within the limit
FAN FAIL	yellow LED if a fan failure is recognized
OVERHEAT	yellow LED if an overheat in the power supply occurs
SYS FAIL	red LED if VME-bus system generates the *SYSFAIL* signal (system failure)
FAN SPEED	Red LED if fan speed below 100%
AUTO OFF	red LED indicates DC cut off disabled, remote warning only, hot swapping of fan tray possible now
LOCAL	Optional if remote network is installed

2.1.4 Hot Swapping of LX Fan Tray [1]

If the "hot swap" function of the fan is activated, the crate may be fully powered during withdrawal of the fan tray. The max. DC- on time has to be programmed (see 2.1.5).

If programmed PsOff- limits of optional installed temperature sensors exceed during fan tray exchange the power supply will trip off to prevent any damage to inserted modules.

2.1.5 Programming of Fan tray

Fan tray parameters (and in the same way many power supply parameters!!) may be changed via the alphanumeric control.

The general procedure is:

- Switch the POWER and the MODE switch up simultaneous for 5 seconds. The display shows „Config: Wait....“ and „Config: Ready !“. Then release both switches.

- If a sub-menu exists, you may now select the sub-menu item (MODE switch up/down). If no sub-menu exists, you may change the parameter value (MODE switch up/down)

- To change a parameter of a sub-menu, select it (POWER switch up). The selected parameter is flashing now.

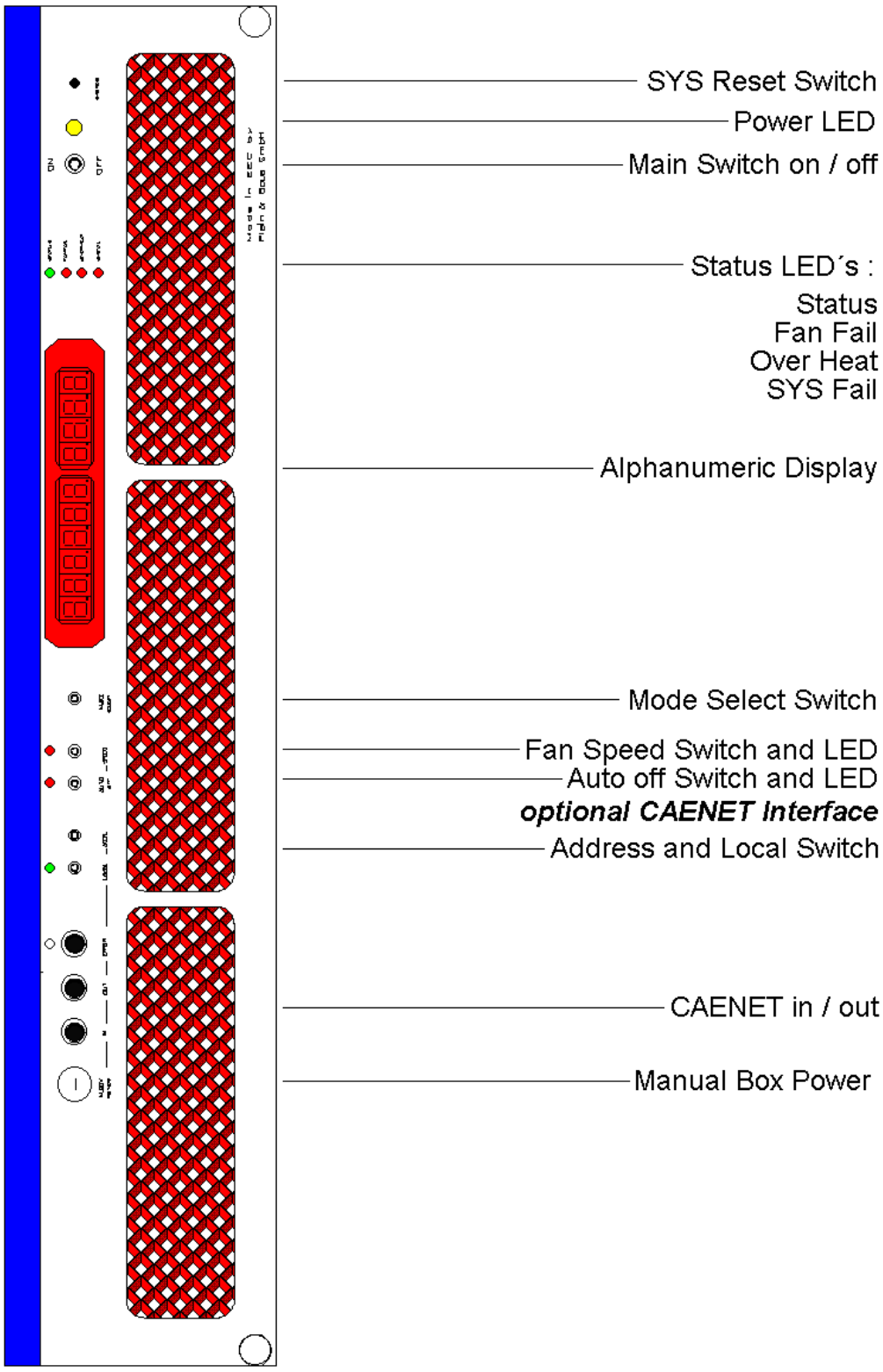
- You may alter the parameter now (MODE switch up/down)

- After finishing the parameter programming, leave the submenu or configuration menu (POWER switch down).

Programmable parameters of a fan tray:

Mode	**associated parameter submenu**	**Description**
Fans	Watching x Fans	Display of the number of monitored fans
Fan Temp	Temp Display: °C Temp Display: °F	Select the temperature unit: Celsius or Fahrenheit
	Function of the FAN AUTO OFF switch [1]	AUTO OFF DIS: The switch will disable the trip off of the power supply if the fans are not working correct. (DANGER: The VME modules may burn! Should be used only for service purpose.) HOT SWAP *time*: The switch will activate the "hot swap" feature. The maximum time the user has got to change the fan tray is set here.
Bin Temp x ($\leq$ 8 sensors), also with EC fans	PsOff	If the temperature of sensor x is above this limit, the power supply will switch off.
	FanUp	If the temperature of sensor x is above this limit, the fan speed will increase to full speed.

1 Implemented in systems produced after October 2000 only



LX 6020 fan-tray front panel with optional CAENET interface

Standard Measurement Ranges

Available Modes and Display Examples (LX Fan trays only)			
Mode	Monitored Values		Description
+5V	5.00 V	115A.... 230A (460)	+5V channel
+12V	12.0 V	11.5 / 46.0A (92)	+12V channel
+15V [2]	15.0 V	11.5 / 35.0A (70)	+15V channel
+3,3V	3.30 V	115.... 230A (460)	3,3V channel
+48V [2]	48,0 V	13,5... 67A	
-5V	5.20 V	100A.... 400A	-5.2V channel
-12V	12.0 V	6.0 / 10.0 / 40.0A (80)	-12V channel
-15V [2]	15.0 V	6.0 / 10.0 / 30.0A (80)	-15V channel
-2V	2.00 V	100.0A.... 200A	-2V channel
POWER	135	W	output power
FANS	3000	RPM	fan rotation speed
FAN TEMP	25	° C or °F	fan air inlet temp.
FAN TIME	82000,6	h	Operating time Fan tray
P.S. TIME	150000,0	h	Operating time Power Supply
Options			
BIN TEMP 1	35°C	° C or °F	bin slot 1 (?) temp.
BIN TEMP 2		° C or °F	bin slot 2 (?) temp.
..... up to			
BIN TEMP 8		° C or °F	bin slot 8 (?) temp.
Networks *			
CAEN*	ADDR	99	CAENET address
BAUD*	RATE	1 MBAUD	CANbus bit rate
CANbus*	ADDR	127	CANbus address
IEC*	ADDR	25	IECbus address

2 Either 15V or 48V- output will be in use, depending on the application (VME 430, VME64x)

2.2 6021- Bin Technical details

2.2.1 VME-Bus Terminology, Signal Identification

BR0*-BR3*	**Bus request (0-3).** Open-collector driven signals generated by requesters. A low level on one of these lines indicates that some master need to use the DTB
D00-D31	**Data bus.** Three-state driven bi-directional lines used to transfer data between masters an slaves, and status/ID information from interrupters to interrupt handlers.
DS0*, DS1*	**Data strobe zero, one.** Three-state driven signals used in conjunction with LWORD* and A01 to indicate how many byte locations are being accessed (1, 2, 3, or 4). In addition, during a write cycle, the falling edge of the first data strobe indicates that valid data is available on the data bus. On a read cycle, the rising edge of the first data strobe indicates that data has been accepted from the data bus.
DTACK*	**Data transfer acknowledge.** An open-collector driven signal generated by a SLAVE. The falling edge of this signal indicates that valid data is available on the data bus during a read cycle, or that data has been accepted from the data bus during a write cycle. The rising edge indicates when the slave has released the data bus at the end of a read cycle.
GND	the dc voltage reference for the system
IACK*	**interrupt acknowledge.** An open-collector or three-state driven signal used by an interrupt handler to acknowledge an interrupt request. It is routed, by way of a backplane signal trace, to the IACKIN* pin of slot 1, where it is monitored by the IACK daisy-chain driver.
IACKIN*	**interrupt acknowledge in.** A totem-pole driven signal. The IACKIN* and IACKOUT* signal indicates to the board receiving it that it is allowed to respond to the interrupt acknowledge cycle that is in progress.
IACKOUT*	**Interrupt acknowledge out.** A totem-pole driven signal. The IACKIN* and IACKOUT* signal is sent by a board to indicate to the next board in the daisy-chain that it is allowed to respond the interrupt acknowledge cycle that is in progress.
IRQ1*-IRQ7*	**Interrupt request (1-7).** Open-collector driven signals, that are driven low by interrupters to request an interrupt. When several lines are monitored by a single handler the highest numbered line is given the highest priority.
LWORD*	**Longword.** A three-state driven signal used in conjunction with DS0*, DS1*, and A01 to select which byte location(s) within the 4-byte group are accessed during the data transfer.
RESERVED	**Reserved.** A signal line reserved for future enhancements.
SERCLK	**Serial clock.** A totem-pole driven signal that is used to synchronize the data transmission on the VMSbus.

SERDAT*	**Serial data.** An open collector driven signal that is used for VMSbus data transmission.
SYSCLK	**System clock.** A totem-pole driven signal that provides a constant 16 MHz clock signal that is independent of any other bus timing.
SYSFAIL*	**System reset.** An open-collector driven signal that indicates when a failure has occurred in the system. This signal can be generated by any board in the system.
SYSRESET*	**System reset.** An open-collector driven signal, which when low, causes the system to be reset.
WRITE*	**Write.** A three-state driven signal generated by the master to indicate whether the data transfer cycle is a read or write. A high level indicates a read operation; a low level indicates a write operation.
+ 5 V STDBY	**+ 5V dc standby.** This line supplies 5 V dc to devices requiring battery backup.
+ 5 V	**+ 5 V dc power.** Used by system logic circuits.
+ 12 V	**+ 12 V dc power.** Used by system logic circuits.
- 12 V	**- 12 V dc power**. Used by system logic circuits.

2.2.2 VME ( ) Bus Current Ratings

Power distribution each slot (20°C / 70°C)	VME J1	VME J2	VME J1-J2	VME 430 J1-Jaux-J2	VME 64x J1
3,3V					17/12A
5V	9,5/7,5A	9,5/7,5A	19/15A	19/15A	8,5/6A
+/-12V	3,2/2,5A		3,2/2,5A	3,2/2,5A	1,7/1,2A
+/-15V				3,2/2,5A	
-5,2V				19/15A	
-2V				9,5/7,5A	
Vw, Vx, Vy, Vz					
V1, V2					1,7/1,2A
Layers	8	4	8	8	10
Type of ADC	mech		mech	mech	active
Termination on board	passive	passive	passive	passive	active
J2 with 160pin		optional	optional	optional	
Power Connections	Studs	Studs	Studs	Studs	Bugs

Bus current ratings

Power distribution	**VME 64x**	**VME64xP**	**VME 64x C**
each slot (20°C / 70°C)	J1-Jo-J2	J1-Jo-J2 **Slot 2- 21**[3]	J1-J2-J3
3,3V	17/12A	17/12A	17/12A
5V	15,3/10,8A	27/19A	15,3/10,8A
+/-12V	1,7/1,2A	1,7/1,2A	1,7/1,2A
Aux 1			28/28A[4]
Aux 2			28/28A[4]
Aux 3			28/28A[4]
+/-24V			
Vw, Vx, Vy, Vz	4/3A	4/3A	
V1, V2	1,7/1,2A	1,7/1,2A	
Layers	10	18	10
Type of ADC	active	active	active
Termination on board	active	active	active
Power Connections	Bugs	Bugs	Bugs

3 **On slot 1 of the 64xP** backplane the Jo is not feeding additional 5V pins. Therefore the current capability for +5V is only **15,3/10,8A.**

4 **64xC Backplane**: 32,5A if all 5 pins in parallel carry same 6,5A current

2.2.3 Pin Assignments of J1 and J2 VME Bus

	J1			J2		
Pin No.	Row A	Row B	Row C	Row A	Row B	Row C
01	D00	BBSY*	D08	User defined	+5 V	User defined
02	D01	BCLR	D09	User defined	GND	User defined
03	D02	ACFAIL*	D10	User defined	Reserved	User defined
04	D03	BG0IN*	D11	User defined	A24	User defined
05	D04	BG0OUT*	D12	User defined	A25	User defined
06	D05	BG1IN*	D13	User defined	A26	User defined
07	D06	BG1OUT*	D14	User defined	A27	User defined
08	D07	BG2IN*	D15	User defined	A28	User defined
09	GND	BG2OUT*	GND	User defined	A29	User defined
10	SYSCLK	BG1IN*	SYSFAIL*	User defined	A30	User defined
11	GND	BG3OUT*	BERR*	User defined	A31	User defined
12	DS1*	BR0*	SYSRESET*	User defined	GND	User defined
13	DS0*	BR1*	LWORD*	User defined	+5 V	User defined
14	WRITE*	BR2*	AM5	User defined	D16	User defined
15	GND	BR3*	A23	User defined	D17	User defined
16	DTACK*	AM0	A22	User defined	D18	User defined
17	GND	AM1	A21	User defined	D19	User defined
18	AS*	AM2	A20	User defined	D20	User defined
19	GND	AM3	A19	User defined	D21	User defined
20	IACK*	GND	A18	User defined	D22	User defined
21	IACKIN*	SERCLK	A17	User defined	D23	User defined
22	IAOUT*	SERDAT	A16	User defined	GND	User defined
23	AM4	GND	A15	User defined	D24	User defined
24	A07	IRQ7*	A14	User defined	D25	User defined
25	A06	IRQ6*	A13	User defined	D26	User defined
26	A05	IRQ5*	A12	User defined	D27	User defined
27	A04	IRQ4*	A11	User defined	D28	User defined
28	A03	IRQ3*	A10	User defined	D29	User defined
29	A02	IRQ2*	A09	User defined	D30	User defined
30	A01	IRQ1*	A08	User defined	D31	User defined
31	-12 V	+5V STDBY	+ 12 V	User defined	GND	User defined
32	+5 V	+ 5 V	+ 5 V	User defined	+ 5 V	User defined

2.2.4 Pin Assignment Jaux of VME 430-Bus (CERN)

Pin Number	Row A	Row B	Row C
01	SN1	GND	SN2
02	SN3	GND	SN4
03	SN5	GND	GND
04	CK*	GND	CK
05	SG*	GND	SG
06	CL*	GND	CL
07	-2 V	-2 V	-2 V
08	- 15 V	CE	+ 15 V
09	- 5,2 V	-5,2 V	- 5,2V
10	- 5,2 V	- 5,2 V	- 5,2V

2.2.4.1 Terminology and Signal Identification of Jaux

SN1... SN5, Binary coded slot No. lines, Geographical address

Slot Number	SN1	SN2	SN3	SN4	SN5
01	NC	GND	GND	GND	GND
02	GND	NC	GND	GND	GND
03	NC	NC	GND	GND	GND
04	GND	GND	NC	GND	GND
05	NC*	GND	NC	GND	GND
06	GND	NC	NC	GND	GND
19	NC	NC	GND	GND	NC
20	GND	GND	NC	GND	NC
21	NC	GND	NC	GND	NC

NC = No Connection (represents H- level, generated by 5k6 resistor on VME modul for TTL, e.g.)

CK, SG and CL signals, Clean Earth

CK, Clock signal, bussed differential line terminated on both sides of the backplane (2 resistors to ground and 1 resistor in between the two lines according to the impedance .

CK positive logic
CK* negative logic

SG, Start / Stop Gate, bussed differential line terminated like CK lines.

SG positive logic
SG* negative logic

CL, Clear, bussed differential line terminated like CK lines.

CL positive logic
CL* negative logic

CE, Clean Earth , unbussed line without termination.

2.2.5 Pin Assignments of VME 64x-Bus

J1 (extended)

Pin No.	Row Z	Row A	Row B	Row C	Row D
01	MPR	D00	BBSY*	D08	VPC (1)
02	GND	D01	BCLR*	D09	GND (1)
03	MCLK	D02	ACFAIL*	D10	+V1
04	GND	D03	BG0IN*	D11	+V2
05	MSD	D04	BG0OUT*	D12	RsvU
06	GND	D05	BG1IN*	D13	-V1
07	MMD	D06	BG1OUT	D14	-V2
08	GND	D07	BG2IN*	D15	RsvU
09	MCTC	GND	BG2OUT*	GND	GAP*
10	GND	SYSCLK	BG1IN*	SYSFAIL*	GAO*
11	RESP*	GND	BG3OUT*	BERR*	GA1*
12	GND	DS1*	BR0*	SYSRESET*	+3.3V
13	RsvBus	DS0*	BR1*	LWORD	GA2*
14	GND	WRITE*	BR2*	AM5	+3.3V
15	RsvBus	GND	BR3*	A23	GA3*
16	GND	DTACK*	AM0	A22	+3.3V
17	RsvBus	GND	AM1	A21	GA4*
18	GND	AS*	AM2	A20	+3.3V
19	RsvBus	GND	AM3	A19	RsvBus
20	GND	IACK*	GND	A18	+3.3V
21	RsvBus	IACKIN*	SERCLK	A17	RsvBus
22	GND	IAOUT*	SERDAT	A16	3.3V
23	RsvBus	AM4	GND	A15	RsvBus
24	GND	A07	IRQ7*	A14	+3.3V
25	RsvBus	A06	IRQ6*	A13	RsvBus
26	GND	A05	IRQ5*	A12	+3.3V
27	RsvBus	A04	IRQ4*	A11	LI/I*
28	GND	A03	IRQ3*	A10	+3.3V
29	RsvBus	A02	IRQ2*	A09	LI/O*
30	GND	A01	IRQ1*	A08	+3.3V
31	RsvBus	-12 V	+5V STDBY	+12 V	GND (1)
32	GND	+5 V	+5V	+ 5 V	VPC (1)

J2 (extended)

Pin No.	Row Z	Row A	Row B	Row C	Row D
01	User defined	User defined	+5 VAC	User defined	User defined(1)
02	GND	User defined	GND	User defined	User defined(1)
03	User defined	User defined	RESERVED	User defined	User defined
04	GND	User defined	A24	User defined	User defined
05	User defined	User defined	A25	User defined	User defined
06	GND	User defined	A26	User defined	User defined
07	User defined	User defined	A27	User defined	User defined
08	GND	User defined	A28	User defined	User defined
09	User defined	User defined	A29	User defined	User defined
10	GND	User defined	A30	User defined	User defined
11	User defined	User defined	A31	User defined	User defined
12	GND	User defined	GND	User defined	User defined
13	User defined	User defined	+5 V	User defined	User defined
14	GND	User defined	D16	User defined	User defined
15	User defined	User defined	D17	User defined	User defined
16	GND	User defined	D18	User defined	User defined
17	User defined	User defined	D19	User defined	User defined
18	GND	User defined	D20	User defined	User defined
19	User defined	User defined	D21	User defined	User defined
20	GND	User defined	D22	User defined	User defined
21	User defined	User defined	D23	User defined	User defined
22	GND	User defined	GND	User defined	User defined
23	User defined	User defined	D24	User defined	User defined
24	GND	User defined	D25	User defined	User defined
25	User defined	User defined	D26	User defined	User defined
26	GND	User defined	D27	User defined	User defined
27	User defined	User defined	D28	User defined	User defined
28	GND	User defined	D29	User defined	User defined
29	User defined	User defined	D30	User defined	User defined
30	GND	User defined	D31	User defined	User defined
31	User defined	User defined	GND	User defined	GND (1)
32	GND	User defined	+5 V	User defined	VPC (1)

2.2.5.1 Pin Assignment Jo of VME 64x-Bus

J0 (extended)

Pos	Row f	Row e	Row d	Row c	Row b	Row a	Row z
1	GND	User defined	User defined	User defined	User defined	User defined	GND
2	GND	User defined	User defined	User defined	User defined	User defined	GND
3	GND	User defined	User defined	User defined	User defined	User defined	GND
4	GND	User defined	User defined	User defined	User defined	User defined	GND
5	GND	User defined	User defined	User defined	User defined	User defined	GND
6	GND	User defined	User defined	User defined	User defined	User defined	GND
7	GND	User defined	User defined	User defined	User defined	User defined	GND
8	GND	User defined	User defined	User defined	User defined	User defined	GND
9	GND	User defined	User defined	User defined	User defined	User defined	GND
10	GND	User defined	User defined	User defined	User defined	User defined	GND
11	GND	User defined	User defined	User defined	User defined	User defined	GND
12	GND	User defined	User defined	User defined	User defined	User defined	GND
13	GND	User defined	User defined	User defined	User defined	User defined	GND
14	GND	User defined	User defined	User defined	User defined	User defined	GND
15	GND	User defined	User defined	User defined	User defined	User defined	GND
16	GND	User defined	User defined	User defined	User defined	User defined	GND
17	GND	User defined	User defined	User defined	User defined	User defined	GND
18	GND	User defined	User defined	User defined	User defined	User defined	GND
19	GND	User defined	User defined	User defined	User defined	User defined	GND

2.2.6 Pin Assignment J0 of VME 64xC –Bus (CERN)

The VME64xC Bus is consists of a monolithic VME64x J1/J2 bus with a special J0 high power distribution bus. The J0 connector is built out of three 10-pin connectors MP2-HP10-51P1-TR (Robinson Nugent) for each slot (Reference Numbers: J0.1A, J0.1B and J0.1C for slot 1, and so on).

A Current of up to 26A/slot could be supplied with each of the six UAUX lines.

Connector	Pin					Signal
J0.A	A1	B1	C1	D1	E1	UAUX1 (3.3V) [5]
	A2	B2	C2	D2	E2	UAUX1 Return
J0.B	A1	B1	C1	D1	E1	UAUX2 (2.5V) [5]
	A2	B2	C2	D2	E2	UAUX2 Return
J0.C	A1	B1	C1	D1	E1	UAUX3 (1.8V) [5]
	A2	B2	C2	D2	E2	UAUX3 Return

[5] or as requested

2.2.7 Special Pin Assignment J0 of VME 64xP - Bus (VIPA)

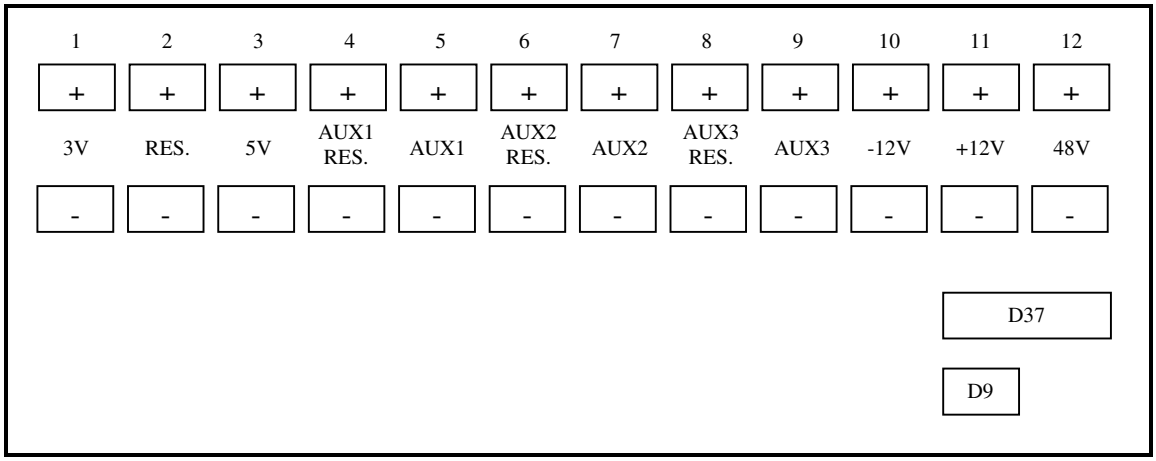
Some user defined pins of the 64x- Jo connector have been specified in the 64xP (VIPA) document to get available additional voltages and signals on the backplane. The slot 1 pin out is identical to those of the Jo of the 64x pin assignment. Slot 2 to 21 are outfitted with the following pin out:

Jo Slot 2-21

Pin No.	Row z	Row a	Row b	Row c	Row d	Row e	Row f
01	COM	+5V	+5V	+5V	+5V	+5V	COM
02	COM	RET_WX	Reserved	+5V	TBUS1+	TBUS1-	COM
03	COM	RET_WX	Reserved	Reserved	TBUS2+	TBUS2-	COM
04	COM	Vw	Reserved	USER I/O	USER I/O	USER I/O	COM
05	COM	Vw	Reserved	USER I/O	USER I/O	USER I/O	COM
06	COM	RET_WX	Reserved	USER I/O	USER I/O	USER I/O	COM
07	COM	AREF_WX	Reserved	USER I/O	USER I/O	USER I/O	COM
08	COM	RET_WX	Reserved	USER I/O	USER I/O	USER I/O	COM
09	COM	Vx	Reserved	USER I/O	USER I/O	USER I/O	COM
10	COM	Vx	Reserved	USER I/O	USER I/O	USER I/O	COM
11	COM	Vy	Reserved	USER I/O	USER I/O	USER I/O	COM
12	COM	Vy	Reserved	USER I/O	USER I/O	USER I/O	COM
13	COM	RET_YZ	Reserved	USER I/O	USER I/O	USER I/O	COM
14	COM	AREF_YZ	Reserved	USER I/O	USER I/O	USER I/O	COM
15	COM	RET_YZ	Reserved	USER I/O	USER I/O	USER I/O	COM
16	COM	Vz	Reserved	USER I/O	USER I/O	USER I/O	COM
17	COM	Vz	Reserved	Reserved	TBUS3+	TBUS3-	COM
18	COM	RET_YZ	Reserved	Reserved	TBUS4+	TBUS4-	COM
19	COM	RET_YZ	Reserved	Reserved	TBUS_OC1	TBUS_OC2	COM

2.3 Power Supply UEP6021

2.3.1 Power Connector Board (Fork Contacts)



Power box rear view!

2.3.1.1 Voltages and Pin outs

Connector Pair	Correspond. Voltage	Description
1	U_3	**+3.3V** (2... 7V) < 345A peak
2		reserved (extension of +3V or +5V)
3	U_0	**+5.0V** (2... 7V) < 345A peak
4		extension of UAUX1 (total 690A)
5	U_7	**UAux 1** (2... 7V) < 345A peak
6		extension of UAUX2 (total 690A peak)
7	U_4	**UAux 2** (2... 7V) < 345A
8		extension of UAUX3 (total 690A peak)
9	U_6	**UAux 3** (2... 7V) < 345A peak
10	U_5	**-12V** (7... 24V) < 345A peak
11	U_1	**+12V** (7... 24V) < 345A peak
12	U_2	**48V** (30... 60V) < 345A peak

Maximal 8 different floating outputs can be controlled in a single power box (U_0... U_7)

2.3.2 Sense and Signal Connector-SUB D 37

		19	TEMP RETURN
37	TEMP 0	18	TEMP 1
36	TEMP 2	17	TEMP 3
35	TEMP 4	16	TEMP 5
34	TEMP 6	15	TEMP 7
33	BIN EEPROM: IIC SDA	14	BIN EEPROM: IIC SCL
32	BIN EEPROM:+5V	13	VME LOGIC: SYSRESET
31	BIN EEPROM: GND	12	VME LOGIC: ACFAIL
30	VME LOGIC GND	11	VME LOGIC: SYSFAIL
29	U0 SENSE -	10	U0 SENSE + **(VME: +5V)**
28	(reserved)	9	(reserved)
27	(reserved)	8	(reserved)
26	U4 SENSE +	7	U4 SENSE – **(Aux 2)**
25	U7 SENSE +	6	U7 SENSE – **(Aux 1)**
24	U2 SENSE -	5	U2 SENSE + **(VME: 48V)**
23	U6 SENSE +	4	U6 SENSE – **(Aux 3)**
22	U1 SENSE -	3	U1 SENSE + **(VME: +12V)**
21	U5 SENSE +	2	U5 SENSE – **(VME: -12V)**
20	U3 SENSE -	1	U3 SENSE + **(VME: +3.3V)**

2.3.3 Fan tray and Control Connector SUB D9

		5	CAN_H
9	CAN_L	4	CAN GND
8	RXD	3	TXD
7	+15V (for fan only)	2	+15V (for fan only)
6	-15V (for fan only)	1	-15V (for fan only)

The CANbus Logic is an option. Data exchange between fan tray and power supply has been done by use of serial connection via RXD and TXD.

2.3.4 Control and Adjustment of 6021 Power Supply

2.3.4.1 Control of the Power Supply 6021 via CAN-Bus (optional)

The CAN Bus Signals are provided on the 9 Pin DSUB:

CAN_H: Pin 5

CAN_L: Pin 9

CAN_GND: Pin 4

The software protocol is described in a separate document (Part No *00183)

CANbus is an independent port. It may used to operate the power supply separately or in combination with the fan tray inside the bin

2.3.4.2 Control of the Power Supply 6021 without PC or Control panel (display)

There is a on/off input and a status output function which are used in combination with an EC- fan tray :

Remote On: 9 Pin DSUB: Close a "make" contact or switch between Pin 8 (Serial Data In, RXD) and Pin 2 or 7.

Status Output: 9 Pin DSUB: Connect a LED between Pin 3 (Serial Data Out, TXD) and Pin 1 or 6.

2.3.4.3 Control of the Power Supply 6021 via Fan tray

Many power supply parameters may be changed via the alphanumeric control of the connected fan tray.

The general procedure is:

- Switch the POWER and the MODE switch up simultaneous for 5 seconds. The display shows „Config: Wait....“ and „Config: Ready !“. Then release both switches.

- If a sub-menu exists, you may now select the sub-menu item (MODE switch up/down). If no sub-menu exists, you may change the parameter value (MODE switch up/down)

- To change a parameter of a sub-menu, select it (POWER switch up). The selected parameter is flashing now.

- You may alter the parameter now (MODE switch up/down)

- After finishing the parameter programming, leave the submenu or configuration menu (POWER switch down).

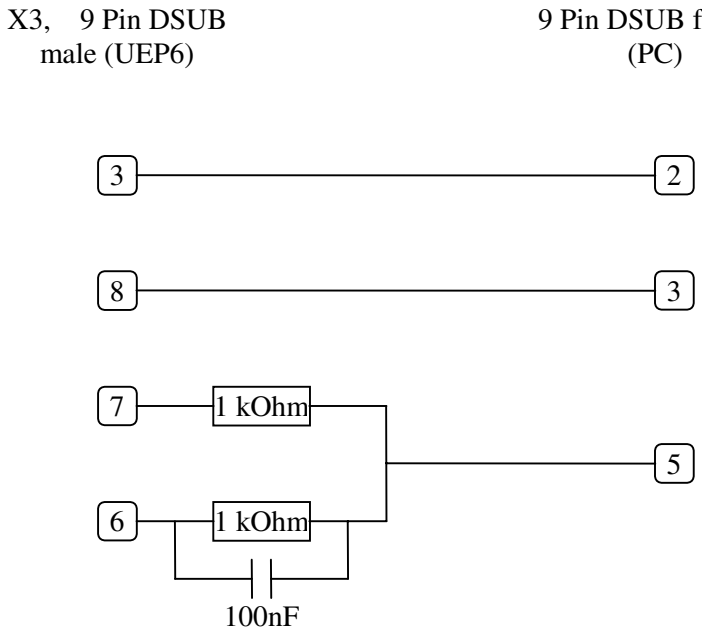
Table 1 List of manual Programming Features

Mode	associated parameter submenu	Description
Any Voltage (e.g. +5V or U0)	Ilim	Output Current limit
	Uadj	Output voltage fine adjustment. The same function as the switches in the power supply
	Unom	Output voltage coarse adjustment.
	Imax	Monitoring: Maximum current for good status.
	Umin	Monitoring: Minimum voltage for good status.
	Umax:	Monitoring: Maximum voltage for good status.
Power	Auto Power On No Auto Power On	Automatic switch on of the power supply after come back of the mains
	Switch Off Normal Switch Off Delay	Delayed switch off: You have to push the POWER switch down for 5 seconds until the power supply switches off

2.3.5 Connection of a Personal Computer to the Power Supply UEP6021

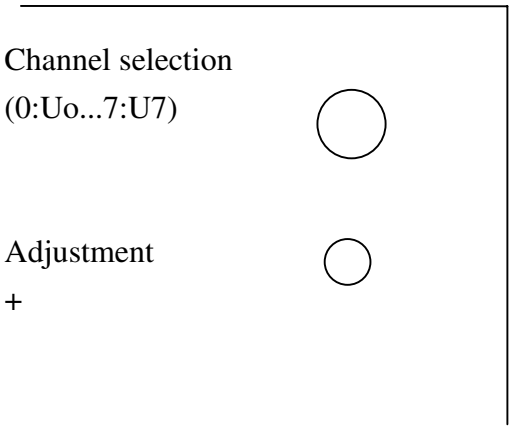
This connection is intended to service functions only. Because of the direct connection between the PC and the power supply, the ripple and noise of the outputs will increase!

The needed staff is an PC running Windows, the control program UEP6 and a simple adapter ("Dongle"). The power supply is connected to the COM port of the PC. For more details, view the document *00461.A0.



2.3.6 Output Voltage Adjustments

All output voltages can be adjusted manually via the two rotary switches situated on the power supply top.



Mode Selection	Function
0-7	Adjust Voltage of U0-U7
A	CAN Address (low, Bit 0-3)
B	CAN Address (high, Bit 4-6)
C	CAN General Call Address (low, Bit 0-3)
D	CAN General Call Address (high, Bit 4-6)
E	CAN Transmission Speed Index

2.3.7 Monitoring Connector

A 15 pin Sub D- monitoring connector is situated at the rear side of the power supply. The Status and Fan fail outputs are given by potential free read contacts. Maximum ratings of these contacts are 24VDC and 0,5A.

Pin out:

Name	Pin No.	Function
Status Contact	1-2	closed contact: All voltages within limits
Power Inhibit	3	Low signal: DC off
Fan fail Contact	5-6	closed contact: All fans work correct
Manual Sys Reset	7	Low signal generates SYSRESET
Disable	13	Low signal disables tripp off mode (trouble shooting
0V Signal Level	4	
CANbus Gnd	9	Optional, if CANbus interface is installed
CANbus low	10	"
CANbus high	11	"

2.3.8 CANbus Option, Transmission Speed Index

Index	Max. Distance	Bit Rate	Type
0	10 m	1.6 Mbit/s	high- speed
1	40 m	1.0 Mbit/s	
2	130 m	500 kbit/s	(needs termination)
3	270 m	250 kbit/s	
4	530 m	125 kbit/s	
5	620 m	100 kbit/s	low-speed
6	1.300m	50 kbit/s	
7	3.300 m	20 kbit/s	
8	6.700 m	10 kbit/s	
9	10.000 m	5 kbit/s	

For software protocol see separate manual No. *00183

APPENDIX A: Technical Details of 6021 Power Supplies

Mains input, 92...265VAC, 16A (32A)
Sinusoidal: **CE** EN 60555, IEC 555 pow. fact. 0,98 (230VAC),
Inrush current: 10 A (20 A), cold unit

Isolation Inp.- outp. **CE** EN 60950, ISO 380, VDE 0805, UL 1950, C22.2.950

DC Output power with different mains inputs (16A), calculated with typical efficiency of 72%

115VAC / 1.325W **230VAC / 2.650W**

(modules selected for 64x application, 5V- 3,3V-+/-12V- 48V, typical efficiency 72%)

Available modules	min. to max. range	max. output, peak	nominal output
Type MEH	2... 7,0V	115A / 630W	100A / 550W
Type MEH	7... 16V	46A / 630W	40A / 550W
Type MEH	30... 60V	13,5A / 650W	12A / 580W
Type MDL (+/-)	7... 24V	11,5A / 2x276W	10A / 2x240W

static:	MEH 550W/650W	<15mV	(+/-100% load, +/- full mains range)
	MDL 280W:	<0,05%	(+/-100% load, +/- full mains range)
dyn.:	MEH	<100mV	(50% ⇔ 75% load, 1A/µs)
	MDL	<0,7%	(+/-25% load, 1A/µs)

Recovery time +/-25% load:	within +-1%	within +-0,1%
Modules 550W	< 0,2ms	< 0,5ms
Modules 650W	< 0,5ms	< 1,0ms
MDL	0,0ms	< 1,0ms

Sense compensation range: full difference between min. and max. output voltage

Noise and ripple: <10mVpp, (0-20MHz) <3mVrms (0-2MHz)
measured at backplane side

Noise and ripple:	0...20 MHz	0...30 MHz
MEH	< 10 mVpp	< 2 mVrms
MDL	< 15 mVpp	< 2 mVrms

measured at Power Supply terminals

EMI

RFI-rejection, emission: **CE** EN 50081-1 VDE 0871B
EMC immunity: **CE** EN 50082-1 or 2

Operation temperature: 0....50°C without derating, Storage:-30°C ... +85°C

Temp.-coefficient: < 0,2% / 10K
Stability (conditions const.): 10mV or 0,1% / 24 hours, 25mV or 0,3% / 6 month

Current limits: adjustable to any lower level

Voltage rise characteristics: monotonic 50ms, processor controlled.

Overvoltage crow bar protection: trip off adjusted to 125% of nominal voltage each output
DC Off (trip off): within 5ms if >+5 /-2,5% (≥ 5V output) deviation from nominal values, adjustable,
after overload, overheat, overvoltage, undervoltage (bad status) and fan fail
if temperatures exceed 110°C heat sink, 70°C ambient

Trip off points adjustable, processor controlled. Output capacitors will be discharged by the crow bars

Efficiency: 68% ... 80%, depends on used modules

M T B F: 40°C ambient >65 000 h 25°C ambient >100 000 h

APPENDIX B: Typical Module Efficiency

Module type	I_{out} %	U_{out} in V	Iout in A	Uin in V	Iin in A	Pout in W	Pin in W	Efficiency in %
MEH 1409266.A6								
MEH 2V	50%	2,01	50	384	0,397	100,5	152,45	65,92
	80%	2,01	80	384	0,653	160,8	250,75	64,13
	100%	2,01	100	384	0,847	201	325,25	61,80
	115%	2,01	115	384	1,009	231,15	387,46	59,66
MEH3,3V	50%	3,31	50	384	0,57	165,5	218,88	75,61
	80%	3,31	80	384	0,936	264,8	359,42	73,67
	100%	3,31	100	384	1,203	331	461,95	71,65
	115%	3,31	115	384	1,418	380,65	544,51	69,91
MEH 5V	50%	5,01	50	384	0,807	250,5	309,89	80,84
	80%	5,01	80	384	1,314	400,8	504,58	79,43
	100%	5,01	100	384	1,666	501	639,74	78,31
	115%	5,01	115	384	1,954	576,15	750,34	76,79
MEH 6V	50%	6,01	41	384	0,766	246,41	294,14	83,77
	80%	6,01	66	384	1,243	396,66	477,31	83,10
	100%	6,01	83	384	1,583	498,83	607,87	82,06
	115%	6,01	96	384	1,856	576,96	712,70	80,95
MEH 10V 1443547								
		5,04	80	395	1,36	403,2	537,20	75,06
		7,5	80	395	1,88	600	742,60	80,80
		10	60	395	1,77	600	699,15	85,82
MEH 1412437.A5								
MEH 12V	50%	12,01	20	384	0,764	240,2	293,38	81,87
	80%	12,01	32	384	1,233	384,32	473,47	81,17
	100%	12,01	40	384	1,561	480,4	599,42	80,14
	115%	12,01	46	384	1,823	552,46	700,03	78,92
MEH15V	50%	15,01	16	384	0,743	240,16	285,31	84,17
	80%	15,01	25,6	384	1,188	384,256	456,19	84,23
	100%	15,01	32	384	1,495	480,32	574,08	83,67

Module type	I_{out} %	U_{out} in V	Iout in A	Uin in V	Iin in A	Pout in W	Pin in W	Efficiency in %
MEH15V	115%	15,01	37	384	1,743	555,37	669,31	82,98
MEH 1436890.A1								
MEH48V	50%	48,02	6	384	0,867	288,12	332,93	86,54
	80%	48,02	9,6	384	1,343	460,992	515,71	89,39
	100%	48,02	12	384	1,677	576,24	643,97	89,48
	115%	48,02	13,5	384	1,89	648,27	725,76	89,32
MDL 1409769.A5								
MDL12V	50%	24,02	5	384	0,383	120,1	147,07	81,66
	80%	24,02	8	384	0,6	192,16	230,40	83,40
	100%	24,02	10	384	0,745	240,2	286,08	83,96
	115%	24,02	11,5	384	0,859	276,23	329,86	83,74
MDL15V	50%	30,02	5	384	0,466	150,1	178,94	83,88
	80%	30,02	8	384	0,733	240,16	281,47	85,32
	100%	30,02	10	384	0,918	300,2	352,51	85,16
	115%	30,02	11,5	384	1,056	345,23	405,50	85,14

APPENDIX C:
DUT Conditions, Power Supply

in preparation

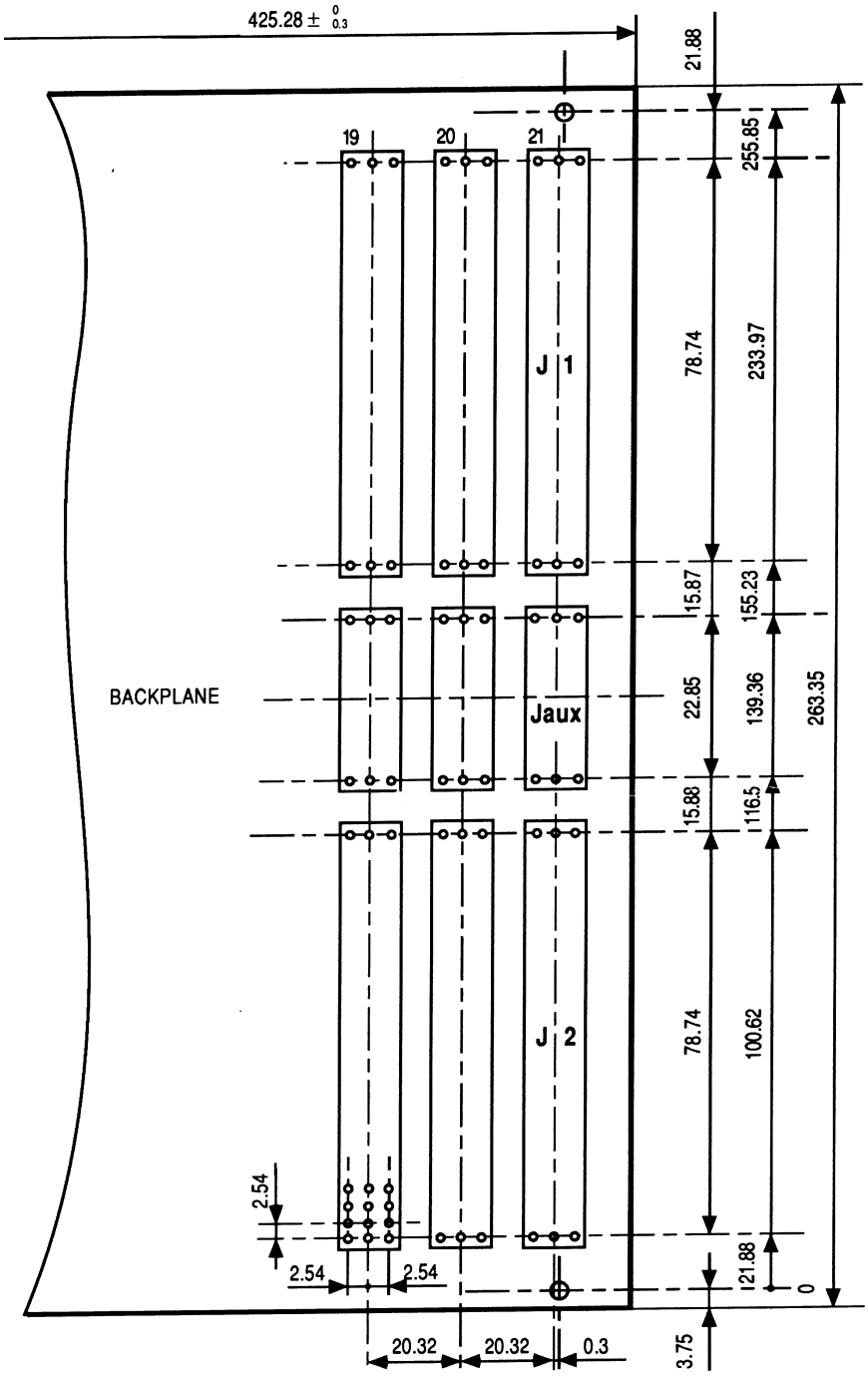
APPENDIX D: Technical Details of Fan Trays

Fan Tray Type	Facilities	No. of Blowers	Depth	Max. Air Flow
6020LX/6	Intelligent	6 x DC	400 mm	>1000m ^{3} / h
6020 EC/6	Simplified	6 x DC	400 mm	>1000m ^{3} / h
6020LX/4s	Intelligent	4 x DC-Super	400 mm	>1500m ^{3} / h
6020 EC/4s	Simplified	4 x DC-Super	400 mm	>1500m ^{3} / h
6020 LX/6s	Intelligent	6 x DC-Super	600 mm	>2200m ^{3} / h
6020 EC/6s	Simplified	6 x DC-Super	600 mm	>2200m ^{3} / h
6020 LX/9	Intelligent	9 x DC	600 mm	>1600m ^{3} / h
6020 EC/9	Simplified	9 x DC	600 mm	>1600m ^{3} / h
6020 LX/9	Intelligent	9 x DC	**690 mm**	>1600m ^{3} / h
6020 EC/9	Simplified	9 x DC	**690 mm**	>1600m ^{3} / h

all fan trays for bottom air inlet only. Equipped with topped plenum chamber, 25mm high.

Static pressure:	DC blower	10 mm H_2O column
	DC Super blower	15 mm H_2O column
Operating Temperature:	0... 70°C	
MTBF:	>65 000 h at 40°C ambient, > 85 000 h at 25°C ambient	

APPENDIX E: VME 430 Backplane, Situation of Jaux Connector



Backplane Dimensions Front view

VMEbus Bin Type V 431

CERN - ECP
V 431 -
1992 . 12 . 03
E.Buchschacher

APPENDIX F: VME 64xC Backplane, Situation of J0 Connector